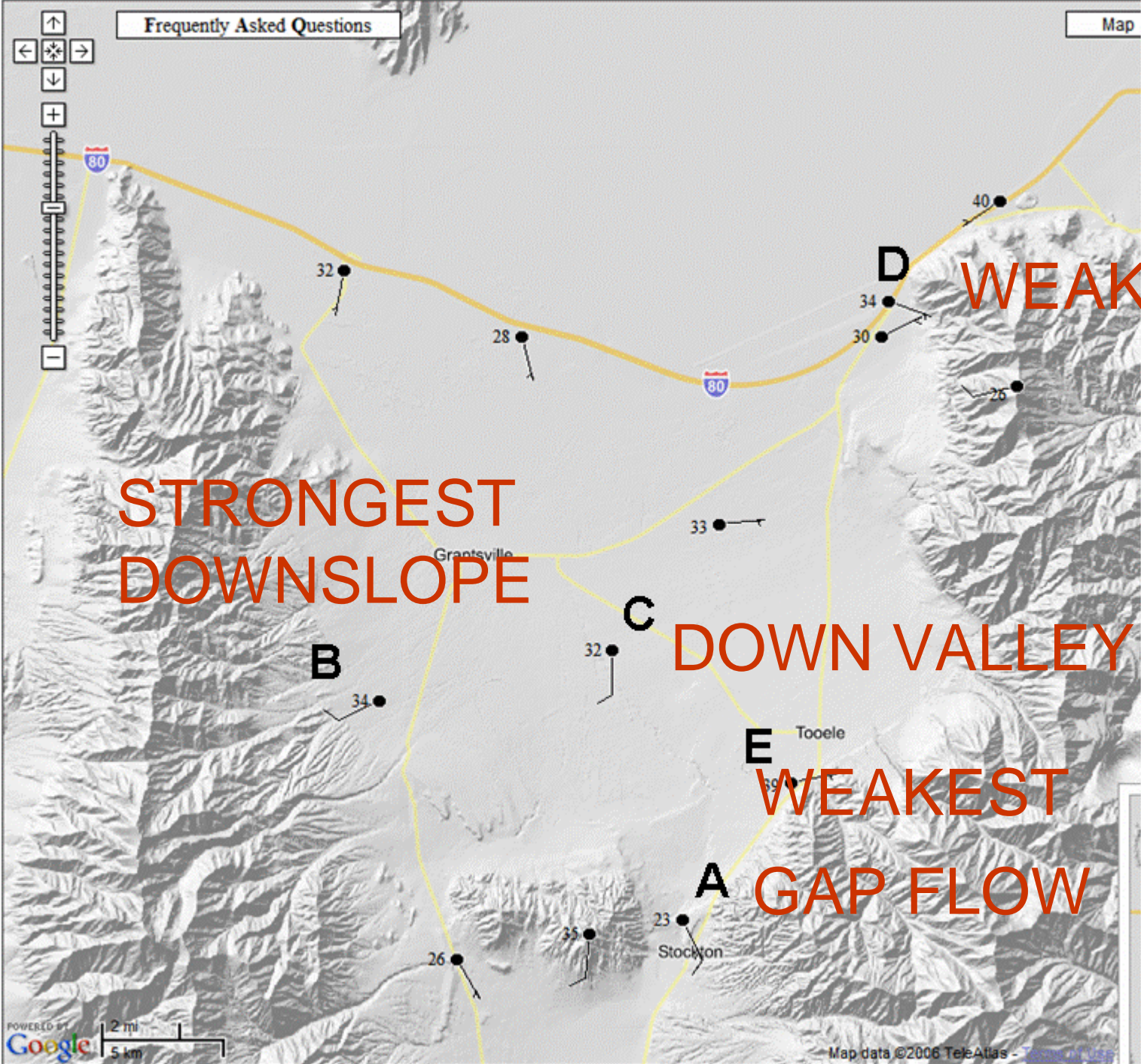
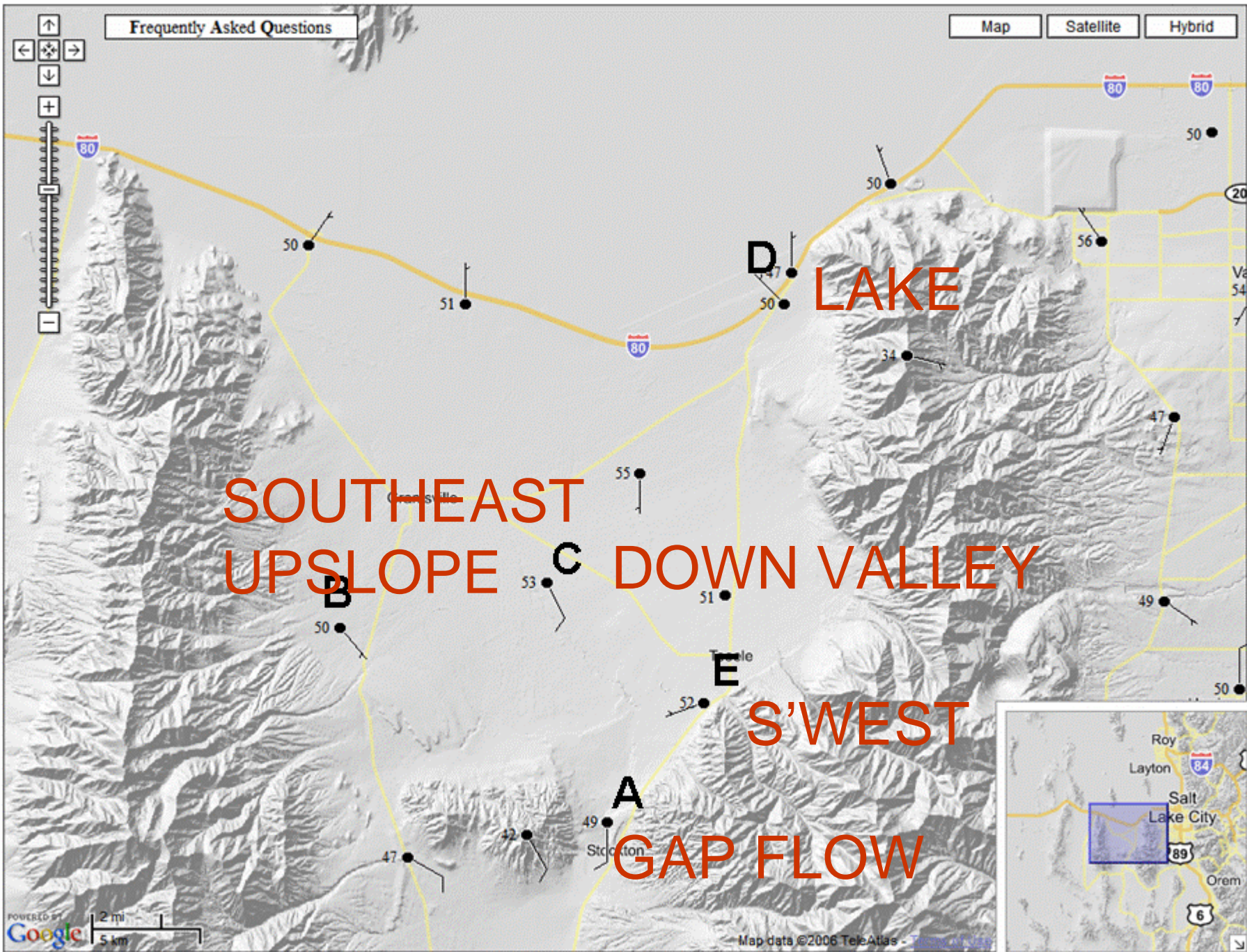
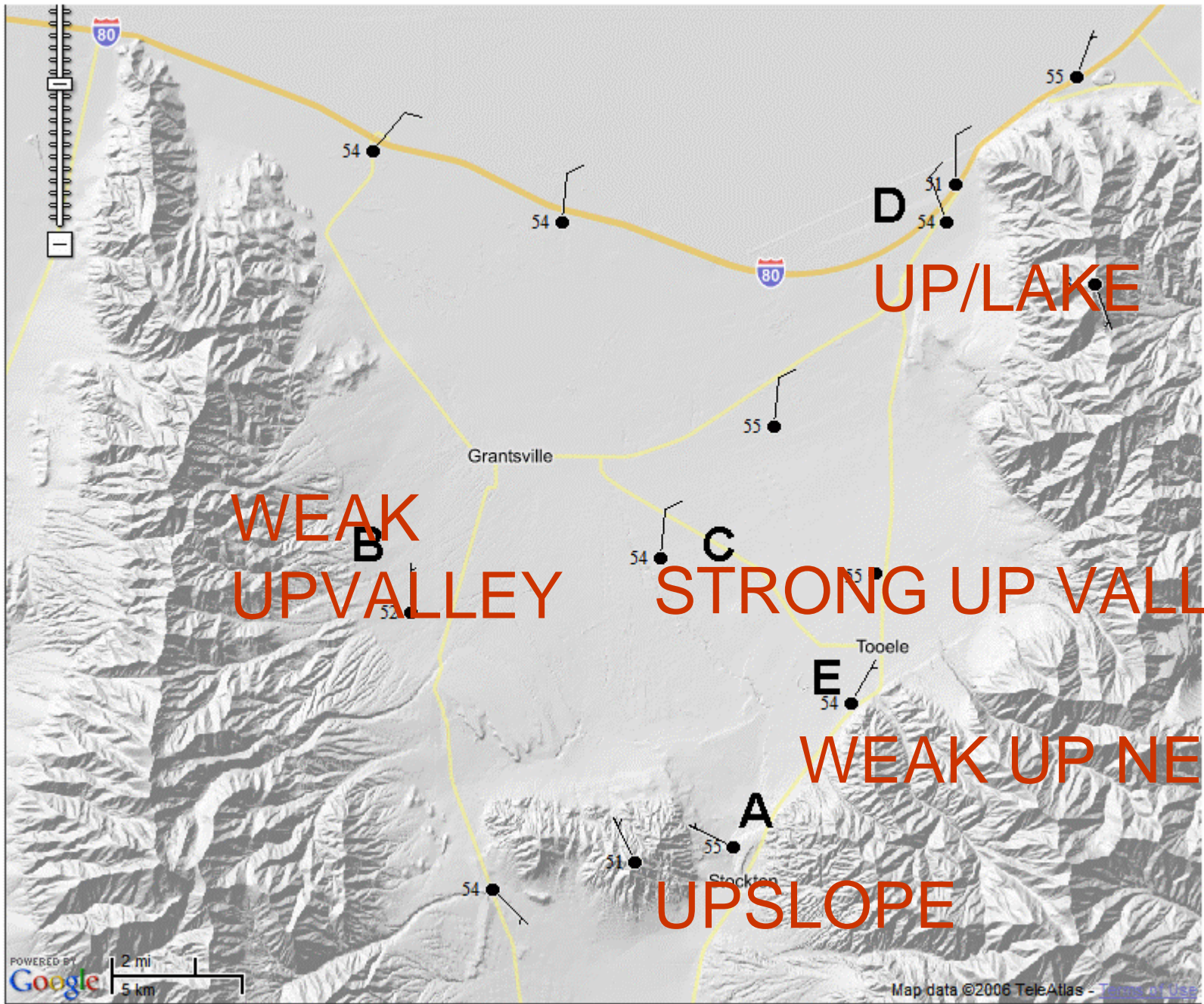


An adiabatic unsaturated air parcel is displaced downwards a short distance and accelerates upwards towards its original position if the density of the air parcel after displacement is _____ (greater/less) than the density of the environment, the temperature of the parcel after its displacement is _____ (greater/less) than the temperature of the environment, the environmental lapse rate is _____ (greater/less) than the dry adiabatic lapse rate, the gravitation force is _____ (greater/less) than the vertical pressure gradient force, the environment in this situation is described as being _____ (stable, neutral, unstable).







**WEAK
UP VALLEY**

STRONG UP VALLEY

UP/LAKE

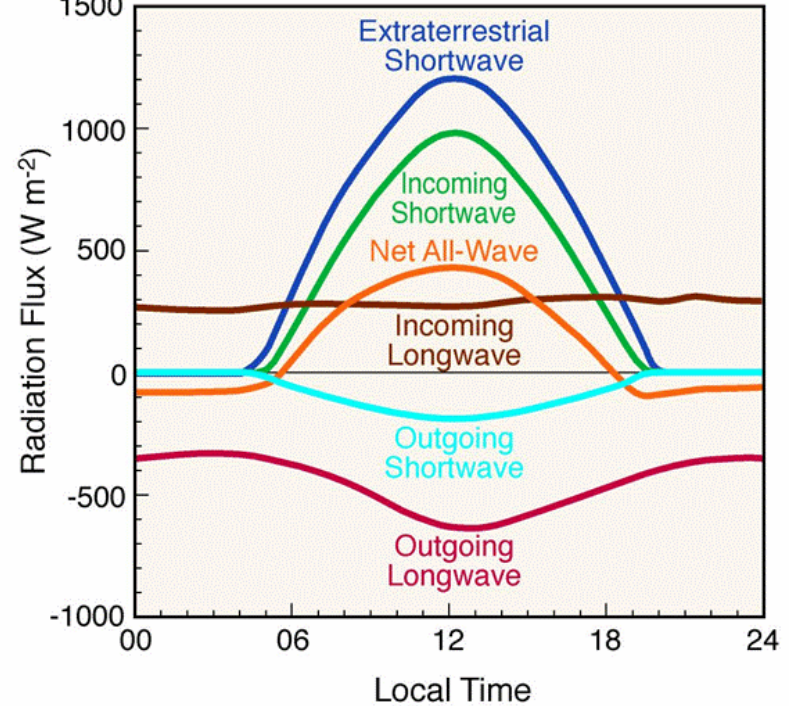
WEAK UP NE

UPSLOPE

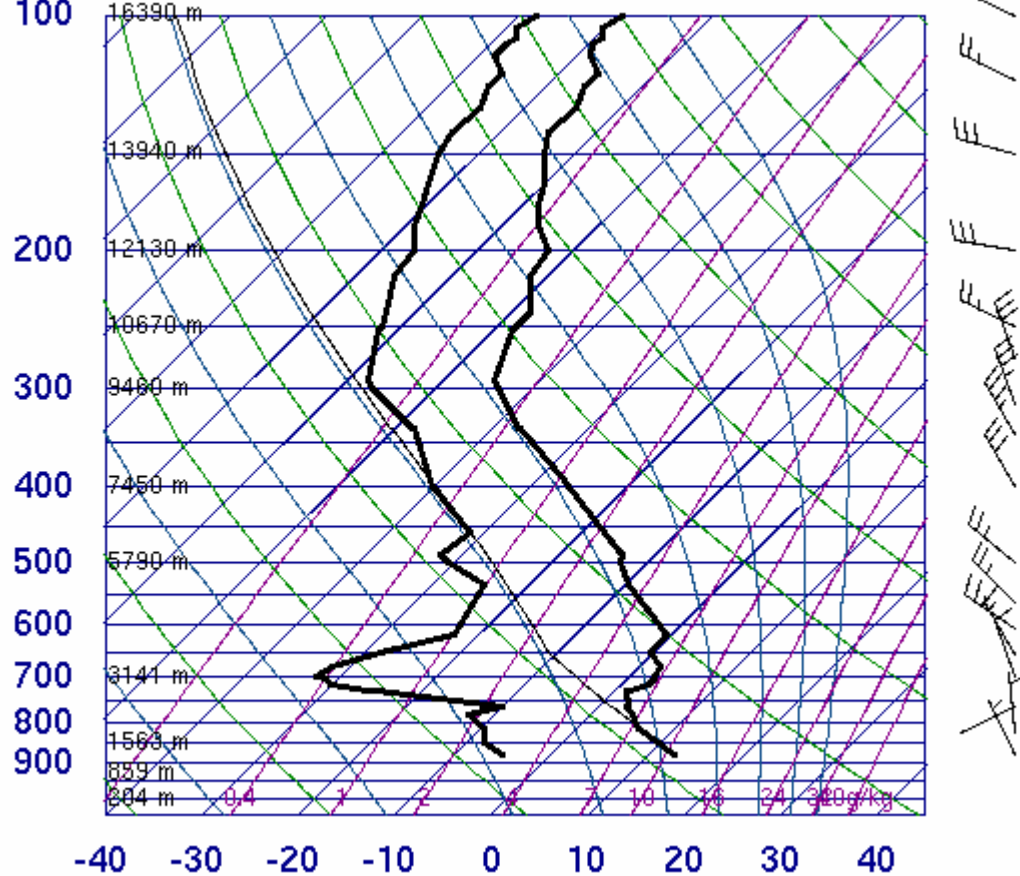
Assume that the Arizona meteor crater experiment took place on the fall equinox only. The crater is located at 35N.

The length of the day is _____(10,12,14) hours long. The sun is directly overhead at solar noon at _____ (35,23,10,0,-10,-20) N. The sun at solar noon is at an angle relative to the vertical of _____(35,25,0) degrees at the meteor crater. The crater is 100 m deep and 2 km wide. You are standing on the floor of the crater in the middle. Shadow touches your feet when the sun's zenith angle is _____(60,70,80)

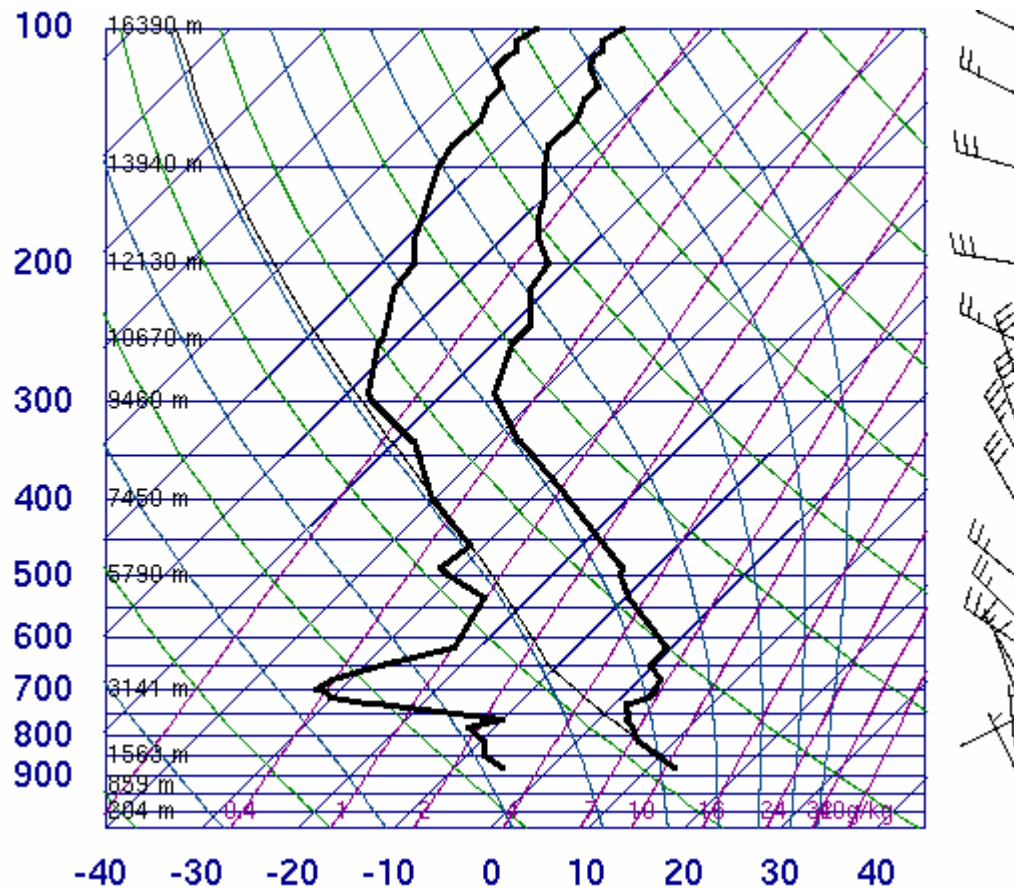
Solar noon. Since the outgoing shortwave is _____ (-200,0,200) W/m², the albedo is _____ (10,16,20)%. The atmosphere is radiating longwave radiation down towards the ground in the amount of _____ (50, 200, -700) W/m². Assuming that the emissivity is 1, the Stefan Boltzman law is $IR = \sigma T^4$ where σ is 5.66×10^{-8} W/(m² K⁴). So, the atmosphere must be radiating at a temperature of _____ (243,263,283,333) K. This temperature is _____ (much below, near, above) freezing. Based on the outgoing longwave radiation, the ground is radiating at a temperature of _____ (243,263,283,333) K.



The surface pressure is ___mb.
 The surface dewpoint temperature is ___C. The lowest melting level is approximately ___mb. Since the dewpoint temperature is (more/less) than 5C lower than the temperature at 700 mb, it is likely that a cloud (is/is not) present at that level. The wind at the surface is (5, 10) kts from the ___ while the wind at 200 mb is ___kts from the _____. In order for fog to form at the surface, the air must cool by (12, 17, 22) C. The environmental lapse rate between the surface and 800 mb can be described most accurately as _____. The environmental lapse rate between 650 and 600 mb can be described most accurately as _____



Assume that the hangglider lifts off from the surface and has a buoyancy force of 1C more than the environment. How high will he rise before he is likely to need to find another buoyant plume? (800, 770, 700) mb. Is it likely that the paraglider will be able to find other thermals to carry him above the crest of the Wasatch at 3000 m? The 850 mb flow at the time is likely to go (around/over) the Wasatch because: wind speeds are (strong/light), wind direction is (parallel/perpendicular) to the mountain range, the stability from 800-600 mb is (unstable, neutral, stable, very stable). You would expect the Froude number for this flow to be (less, equal, more) than 1 and that the kinetic energy of the flow would be (less/equal/more) than the potential energy.



The near-surface winds at this time suggest that the flow is likely being driven by (thermally driven/terrain forced) processes. The direction of the flow suggests some combination of (up/down) valley flows due to temperature differences between the (valley/lower slopes) and (mountains/upper slopes). The (lower/higher) temperature of the Great Salt Lake compared to the valley in the afternoon may also play a role.

Exam Questions

- 10 or so True/false
- Interpretation of surface energy/surface radiation balance from Chapter 4
- Examination of SLC sounding on Monday afternoon
- Identification of radiation components from visible/infrared imagery
- Froude number; blocked flow
- Identification of up/down valley/slope flows in SL valley
- Use of zenith angle
- Hodograph of up/down valley/slope flows

